

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

POWER MANAGEMENT SOLUTIONS LLC,)
)
Plaintiff,)
)
v.) C.A. No. 11-743 (RGA)
)
INTEL CORPORATION,)
MARVELL SEMICONDUCTOR, INC., and)
TEXAS INSTRUMENTS CORPORATION,)
)
Defendants.)

CLAIM CONSTRUCTION ORDER

The parties having briefed their positions on construction of the claims of United States Patent No. 5,504,909 (the “’909 patent”), and the Court having conducted a consolidated *Markman* hearing on the disputed terms on January 18, 2013,¹ it is hereby ordered that, as used in the ’909 patent, the terms below are construed as follows:

I. AGREED-UPON TERMS

The parties agreed upon the constructions of certain terms of the ’909 patent, and the Court accepts them as set forth below for the purposes of this litigation.

Claim Term:	“first electrical signals”
Agreed upon Construction:²	electrical signals that are input to, and/or output from, an internal functional circuit

¹ The *Markman* hearing in this action was consolidated with *Markman* hearings in two other actions involving the ’909 patent: *Power Management Solutions, LLC v. Advanced Micro Devices, Inc.*, C.A. No. 12-426 (RGA), and *Power Management Solutions, LLC v. NVIDIA Corporation*, C.A. No. 12-427 (RGA).

² The parties in this action have agreed to this construction of “first electrical signals.” In the separate -426 action, Defendant Advanced Micro Devices proposed an alternative construction. The Court adopts the agreed construction of the parties in this action.

Claim Term:	“first control input”
Agreed upon Construction:	the structural element of the power gating means that receives the signal that controls the power gating means

Claim Term:	“second control input”
Agreed upon Construction:	the structural element of the switching means that receives the signal that controls the switching means

Claim Term:	“means for constructing and interconnecting electrical circuits”
Agreed upon Construction:	integrated circuit substrate

Claim Term:	“power gating means”
Agreed upon Construction:	<p>This limitation is governed by 35 U.S.C. § 112, ¶ 6.</p> <p><i>Function:</i></p> <p style="margin-left: 40px;">coupling power between the external power supply and the internal functional circuit in response to the assertion of the second externally generated electrical signal, and uncoupling power between the external power supply and the internal functional circuit in response to the deassertion of the second externally generated electrical signal</p> <p><i>Corresponding Structure:</i></p> <p style="margin-left: 40px;">A power gate as defined at col. 3:61-4:8, and as shown as elements 60 and 61 in figures 2 through 4. A power gate is a power switching means for making or breaking a connection between a power source and its load on command, implemented as an electrically controllable electronic switch. A power gate consists of three terminals: a control input terminal, a power input terminal, and a power output terminal. When the control input terminal is asserted, the power gate causes a low impedance to be presented between the power input terminal and the power output terminal. When the control input terminal is deasserted, the power gate causes a high impedance to be presented between the power input terminal and the power output terminal. A power gate differs from an I/O switch in that it is capable of transferring a specified amount of power from its power input terminal to its power output terminal with a specified efficiency.</p>

Claim Term:	“switching means”
Agreed upon Construction:	<p>This limitation is governed by 35 U.S.C. § 112, ¶ 6.</p> <p><i>Function:</i></p> <p style="margin-left: 40px;">coupling the first electrical signals passed between the external functional circuit and the internal functional circuit in response to the assertion of the second externally generated electrical signal, and uncoupling the first electrical signals passed between the external functional circuit and the internal functional circuit in response to the deassertion of the second externally generated electrical signal</p> <p><i>Corresponding Structure:</i></p> <p style="margin-left: 40px;">An I/O switch as defined at col. 4:9-22, and as shown as elements 62 and 63 in figures 2 through 4, which is a bidirectional switch as shown by the bidirectional arrows of connection means 32, 52 and 33, 53. An I/O switch is an electronically controllable electronic signal switching means for isolating a powered-on circuit from a powered-off circuit. An I/O switch consists of three terminals: a control input terminal, a signal input terminal, and a signal output terminal. When the control input terminal is asserted, the I/O switch causes a low impedance to be presented between the signal input terminal and the signal output terminal. When the control input terminal is deasserted, the I/O switch causes a high impedance to be presented between the signal input terminal and the signal output terminal. An I/O switch differs from a power gate in that it is required to transport a signal from its signal input to its signal output with specified fidelity.</p>

Claim Term:	“sequencing means”
Agreed upon Construction:	<p>This limitation is governed by 35 U.S.C. § 112, ¶ 6.</p> <p><i>Function:</i> controlling the relative time relationship of changes in the state of coupling in the power gating means and in the switching means</p> <p><i>Corresponding Structure:</i> A sequencer as disclosed at '909 Patent, Col. 14:56-65, and as shown as element 65 in figure 4. A sequencer has two output terminals: a power gate control output terminal and a switch control output terminal. The power gate control output terminal of the sequencer is connected to the control input terminals of the power gates via a connection means. The switch control output terminal of the sequencer is connected to the control input terminals on the I/O switches via a connection means.</p>

Claim Term:	“third electrical signal”
Agreed upon Construction: ³	an electrical control signal that is passed from the sequencing means to the first control input of the power gating means at a different time than the fourth electrical signal is sent to the switching means

Claim Term:	“fourth electrical signal”
Agreed upon Construction:	an electrical control signal that is passed from the sequencing means to the second control input of the switching means at a different time than the third electrical signal is sent to the power gating means

II. DISPUTED TERMS

The parties have disputed the constructions of certain other terms of the '909 patent. The Court adopts the following constructions of those terms:

³ The parties reached agreement on the construction of the “third electrical signal” and “fourth electrical signal” terms following the *Markman* hearing.

1. The term “internal” is construed to mean “on the integrated circuit substrate” and the term “external” is construed to mean “off the integrated circuit substrate.”⁴ The claims, specification and prosecution history all support this construction of “internal” and “external.” Claim 1 divides internal components and external components based on whether they are on the integrated circuit substrate or off the integrated circuit substrate, respectively. The three claim components that are claimed to be on the integrated circuit substrate are: (1) the internal functional circuit, (2) a power gating means, and (3) a switching means. ’909 patent at col.19 ll.25-27. Similarly, claim 2 claims “a buffering means” “on the integrated circuit substrate,” *id.* at col.20 ll.23-25, and claim 3 claims a “sequencing means” “on the integrated circuit substrate.” *Id.* at col.20 ll.32-34. By contrast, none of the claims lists the “external power supply” or the “external functional circuit” among the components that are “on the integrated circuit substrate.” These “external components,” therefore, must be off the integrated circuit substrate.

The Court’s constructions of “internal” and “external” are also supported by the distinctions that the patentees drew between the first embodiment and the second embodiment of the claimed invention. The patent specification expressly distinguishes the first and second embodiments by stating that “[t]he first embodiment represents an internal solution, the second embodiment represents [an] external solution.” *Id.* at col.6 ll.57-58. In the first embodiment, the “internal” power management apparatus is on the integrated circuit substrate with the internal functional circuit, *id.* at col.5 ll.43-46, whereas in the second embodiment, the “external” power

⁴ The parties did not originally propose to construe “internal” or “external” individually in this action, but instead proposed constructions for “internal” and “external” in the context of other claim terms. In the separate 12-426 action, the parties proposed constructions for “internal” and “external” individually. Because the parties in this action addressed the terms “internal” and “external” individually at the *Markman* hearing, the Court will construe them individually here.

management apparatus is off the integrated circuit substrate that contains the internal functional circuit. *Id.* at col.5 ll.55-66; *id.* at col.6 ll.43-45.

Finally, the '909 patent's prosecution history also supports these constructions. Asserted claim 1 was an amendment to a cancelled claim that was numbered claim 13, which was an amendment to a cancelled claim numbered claim 7, which was an amendment to the patentees' originally filed claim 1. (D.I. 85, Exs. 1 and 2). For each of these amendments, the patentees explained that the amendment "is a rewrite" and "does not represent new material." Accordingly, the cancelled claims 13 and 7 provide additional evidence of how the patentees used the modifiers "internal" and "external" in the '909 patent. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005) (en banc). Specifically, cancelled claim 7 required "at least one signal pad" and provided that "one or more first electrical signals are controllably passed between an external electronic circuit connected to one or more signal pads to the functional circuit." (D.I. 85, Ex. 1). The patent defines a "pad" as "an area of an integrated circuit substrate." '909 patent at col.4 ll.47-49. These pads, thus, are the connections between the integrated circuit substrate and the devices external to, or off, the integrated circuit substrate.

2. The term "internal functional circuit" is construed to mean "a circuit on the integrated circuit substrate that performs a specified electronic function or group of electronic functions." This construction is consistent with the Court's construction of "internal" and the term "functional circuit" as that term is defined in the patent. '909 patent at col.4 ll.31-32 (defining "functional circuit" as "a means for performing a specified electronic function or group of electronic functions.").

3. The term "external functional circuit" is construed to mean "a circuit off the integrated circuit substrate that performs a specified electronic function or group of electronic

functions.” As with “internal functional circuit,” this construction is consistent with the Court’s construction of “external” and the term “functional circuit” as that term is defined in the ’909 patent.

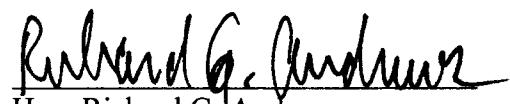
4. The term “externally generated” is construed to mean “generated off the integrated circuit substrate.” This construction is consistent with the Court’s construction of “external.”

5. The term “second externally generated electrical signal” is construed to mean “a signal generated off the integrated circuit substrate that controls the coupling and uncoupling of the power gating means, and the coupling and uncoupling of the switching means.” This construction is consistent with the Court’s construction of “external.” This construction is also consistent with the specification. The specification consistently describes the power control signals that control the power gates and I/O switches as being generated off the integrated circuit substrate. *See, e.g.*, ’909 patent, Figs. 2-7; *id.* at col.14 ll.29-42; col.15 ll.6-8. These I/O pads are the integrated circuit substrate’s interfaces to devices off the integrated circuit substrate. *See* ’909 patent, col.4 ll.47-49. The fact that the “power control signal” enters the integrated circuit substrate through an I/O pad in every embodiment further confirms that the second externally generated electrical signal is generated off the integrated circuit substrate.

6. The term “internal functional circuit function” is construed to mean “the specified electronic function or group of electronic functions that the internal functional circuit was designed to perform using power and the first electrical signals.” This construction is consistent with the specification, which defines “functional circuit” as a “means for performing a specified electronic function or group of electronic functions.” ’909 patent at col.4 ll.31-32.

7. The term “allowing submicrosecond recovery of internal functional circuit function upon the assertion of the second externally generated electrical signal” is construed to mean “allowing recovery of the specified function or group of electronic functions of the internal functional circuit in less than one microsecond from the assertion of the second externally generated electrical signal.” This construction is consistent with the ’909 patent’s definition of “functional circuit.”

Entered this 30th day of May, 2013.


Hon. Richard G. Andrews
United States District Judge